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Irish Standard
I.S. EN ISO 14505-2:2006

**Ergonomics of the thermal environment -
Evaluation of thermal environments in
vehicles - Part 2: Determination of
equivalent temperature (ISO 14505
-2:2006)**

I.S. EN ISO 14505-2:2006

Incorporating amendments/corrigenda issued since publication:

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NSAI
Standards

Corrigendum
I.S. EN ISO 14505-2:2006/AC:2009

**Ergonomics of the thermal environment -
Evaluation of thermal
environments in vehicles - Part 2:
Determination of equivalent temperature
(ISO 14505-2:2006/Cor 1:2007)**

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Ergonomics of the thermal environment - Evaluation of thermal environments in vehicles - Part 2: Determination of equivalent temperature (ISO 14505-2:2006/Cor 1:2007)

Ergonomie des ambiances thermiques - Évaluation des ambiances thermiques dans les véhicules - Partie 2: Détermination de la température équivalente (ISO 14505-2:2006/Cor 1:2007)

Ergonomie der thermischen Umgebung - Beurteilung der thermischen Umgebung in Fahrzeugen - Teil 2: Bestimmung der Äquivalenttemperatur (ISO 14505-2:2006/Cor 1:2007)

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Ce corrigendum prendra effet le 29 avril 2009 pour incorporation dans les versions officielles allemande et anglaise de la EN.

Die Berichtigung tritt am 29. April 2009 zur Einarbeitung in die offizielle Deutsche und Englische Fassung der EN in Kraft.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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TECHNICAL CORRIGENDUM 1

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Ergonomics of the thermal environment — Evaluation of thermal environments in vehicles —

Part 2: Determination of equivalent temperature

TECHNICAL CORRIGENDUM 1

*Ergonomie des ambiances thermiques — Évaluation des ambiances thermiques dans les véhicules —
Partie 2: Détermination de la température équivalente*

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to ISO 14505-2:2006 was prepared by Technical Committee ISO/TC 159, Ergonomics, Subcommittee SC 5, Ergonomics of the physical environment.

Page 3

Subclause 4.2, Equation 2

Replace Equation 2 with the following:

$$C = h_c (t_{sk} - t_a) \quad (2)$$

where

R is heat exchange by radiation, in watts per square metre (W/m^2);

C is heat exchange by convection, in watts per square metre (W/m^2);

h_r is the radiation heat transfer coefficient, in watts per square metre degree Celsius [$W/(m^2\text{°C})$];

h_c is the convection heat transfer coefficient, in watts per square metre degree Celsius [$W/(m^2\text{°C})$];

t_{sk} is the skin temperature, in degrees Celsius (°C);

\bar{t}_r is the mean radiant temperature, in degrees Celsius (°C);

t_a is the ambient air temperature, in degrees Celsius (°C).



National Standards Authority of Ireland

IRISH STANDARD

I.S. EN ISO 14505-2:2006

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**ERGONOMICS OF THE THERMAL
ENVIRONMENT - EVALUATION OF THERMAL
ENVIRONMENTS IN VEHICLES - PART 2:
DETERMINATION OF EQUIVALENT
TEMPERATURE (ISO 14505-2:2006)**

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Ergonomics of the thermal environment - Evaluation of thermal environments in vehicles - Part 2: Determination of equivalent temperature (ISO 14505-2:2006)

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Ergonomie der thermischen Umgebung - Beurteilung der thermischen Umgebung in Fahrzeugen - Teil 2: Bestimmung der Äquivalenttemperatur (ISO 14505-2:2006)

This European Standard was approved by CEN on 14 December 2006.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN ISO 14505-2:2006 (E)

Foreword

This document (EN ISO 14505-2:2006) has been prepared by Technical Committee ISO/TC 159 "Ergonomics" in collaboration with Technical Committee CEN/TC 122 "Ergonomics", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2007, and conflicting national standards shall be withdrawn at the latest by June 2007.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 14505-2:2006 has been approved by CEN as EN ISO 14505-2:2006 without any modifications.

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Ergonomics of the thermal environment — Evaluation of thermal environments in vehicles —

Part 2: Determination of equivalent temperature

*Ergonomie des ambiances thermiques — Évaluation des ambiances
thermiques dans les véhicules —*

Partie 2: Détermination de la température équivalente



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ISO 14505-2:2006(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14505-2 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 5, *Ergonomics of the physical environment*.

ISO 14505 consists of the following parts, under the general title *Ergonomics of the thermal environment — Evaluation of thermal environments in vehicles*:

- *Part 1: Principles and methods for assessment of thermal stress* [Technical Specification]
- *Part 2: Determination of equivalent temperature*
- *Part 3: Evaluation of thermal comfort using human subjects*

Introduction

The interaction of convective, radiative and conductive heat exchange in a vehicle compartment is very complex. External thermal loads in combination with the internal heating and ventilation system of the vehicle create a local climate that can vary considerably in space and time. Asymmetric thermal conditions arise and these are often the main cause of complaints of thermal discomfort. In vehicles without or having a poor heating, ventilating and air-conditioning system (HVAC-system), thermal stress is determined largely by the impact of the ambient climatic conditions on the vehicle compartment. Subjective evaluation is integrative, as the individual combines into one reaction the combined effect of several thermal stimuli. However, it is not sufficiently detailed or accurate for repeated use. Technical measurements provide detailed and accurate information, but require integration in order to predict the thermal effects on humans. Since several climatic factors play a role for the final heat exchange of a person, an integrated measure of these factors, representing their relative importance, is required.

Ergonomics of the thermal environment — Evaluation of thermal environments in vehicles —

Part 2: Determination of equivalent temperature

1 Scope

This part of ISO 14505 provides guidelines for the assessment of the thermal conditions inside a vehicle compartment. It can also be applied to other confined spaces with asymmetric climatic conditions. It is primarily intended for assessment of thermal conditions, when deviations from thermal neutrality are relatively small. Appropriate methodology as given in this part of ISO 14505 can be chosen for inclusion in specific performance standards for testing of HVAC-systems for vehicles and similar confined spaces.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies

ISO 13731, *Ergonomics of the thermal environment — Vocabulary and symbols*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13731 and the following apply.

3.1 equivalent temperature

t_{eq}
temperature of a homogenous space, with mean radiant temperature equal to air temperature and zero air velocity, in which a person exchanges the same heat loss by convection and radiation as in the actual conditions under assessment

3.2 whole body equivalent temperature

$t_{eq,whole}$
temperature of an imaginary enclosure with the same temperature in air and on surrounding surfaces and with air velocity equal to zero in which a full-scale, human shaped, heated sensor will exchange the same dry heat by radiation and convection as in the actual non-uniform environment

3.3 segmental equivalent temperature

$t_{eq,segment}$
uniform temperature of an imaginary enclosure with the same temperature in air and on surrounding surfaces and with air velocity equal to zero in which one or more selected zones of a thermal manikin will exchange the same dry heat by radiation and convection as in the actual non-uniform environment

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